

Docket No. EHAR0010
US App. No. 09/856,402

IN THE CLAIMS:

1. (currently amended) A polishing machine for a peripheral edge of a semiconductor wafer, said machine comprising:

a rotary mechanism for holding a semiconductor wafer while rotating it in a prescribed direction;

a rotary body which rotates relative to the semiconductor wafer while maintaining a prescribed gap from a periphery of said semiconductor wafer, having a rotary axis which is set in the same direction as the rotary axis of said semiconductor wafer, so that the rotary body and the semiconductor wafer are not in contact with each other during a complete polishing process;

a polishing solution channel for channeling the flow of polishing solution to said gap; and

a polishing solution supply portion for supplying the polishing solution to said polishing solution channel;

wherein said polishing solution is drawn into said gap between the peripheral edge of said semiconductor wafer and said rotary body, and polishing abrasive particles in said polishing solution collide with the peripheral edge of said semiconductor wafer to conduct non-contact polishing of the peripheral edge of said semiconductor wafer.

2. (currently amended) A polishing machine for a peripheral edge of a semiconductor wafer, said machine comprising:

a rotary mechanism for holding a semiconductor wafer while rotating it in a prescribed direction;

a rotary body which rotates relative to the semiconductor wafer while maintaining a prescribed gap from a periphery of said semiconductor wafer, having a rotary axis which is set in the same direction as the rotary axis of said semiconductor wafer, so that the rotary body and the semiconductor wafer are not in contact with each other during a complete polishing process;

a polishing solution tank for immersing said rotary mechanism and said rotary body in polishing solution; and

a polishing solution circulation portion for circulating the polishing solution in and out of said polishing solution tank;

wherein said polishing solution is drawn into said gap between the peripheral edge of said

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semiconductor wafer and said rotary body, and polishing abrasive particles in said polishing solution collide with the peripheral edge of said semiconductor wafer to conduct non-contact polishing of the peripheral edge of said semiconductor wafer.

3. (original) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein said rotary mechanism holds a plurality of semiconductor wafers in a stacked state.

4. (original) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein dynamic pressure generating grooves are formed on the peripheral surface of said rotary body facing the periphery of said semiconductor wafer.

5. (original) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein a magnet is installed in said rotary body and a magnetic polishing solution is used as said polishing solution.

6. (original) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein at least the peripheral surface of said rotary body facing the periphery of said semiconductor wafer is formed of an elastic material with a hardness in the range of 7 - 40 Hs.

7. (previously presented) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 2, wherein said rotary mechanism holds a plurality of semiconductor wafers in a stacked state.

8. (previously presented) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 2, wherein dynamic pressure generating grooves are formed on the peripheral surface of said rotary body facing the periphery of said semiconductor wafer.

9. (previously presented) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 2, wherein a magnet is installed in said rotary body and a magnetic polishing solution is used as said polishing solution.

10. (previously presented) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 2, wherein at least the peripheral surface of said rotary body facing the periphery of said semiconductor wafer is formed of an elastic material with a hardness in the range of 7 - 40 Hs.

11. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein the rotary mechanism holds a plurality of semiconductor wafers

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forming a cylindrical shaped stack, the rotary body is accommodated in a housing, the housing has a contact surface conforming to a circumference of the cylindrical shaped stack of the semiconductor wafers, an aperture is formed in the contact surface to expose the semiconductor wafers to the rotary body.

12. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 11, wherein the contact surface of the housing is in sealed contact with the circumference of the cylindrical shaped stack of the semiconductor wafers.

13. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 11, wherein the cylindrical shaped stack comprises disc shaped spacers to separate each of the semiconductor wafers, the diameter of the disc shaped spacers is larger than the diameter of the semiconductor wafers.

14. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 1, wherein the rotary mechanism holds a plurality of semiconductor wafers forming a cylindrical shaped stack, the rotary body has a hollow cylindrical shape for accommodating the cylindrical shaped stack of the semiconductor wafers, said prescribed gap is formed between an inner surface of the hollow cylindrical shaped rotary body and a circumference of the cylindrical shaped stack of the semiconductor wafers

15. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 14, wherein a dynamic pressure groove is formed on the inner surface of the hollow cylindrical shaped rotary body, extending in the direction of the rotary axis of the hollow cylindrical shaped rotary body.

16. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 14, further comprising a fixed hollow cylindrical body for accommodating the hollow cylindrical shaped rotary body, a passage is formed between an outer surface of the hollow cylindrical shaped rotary body and an inner surface of the fixed hollow cylindrical body for providing the polishing solution.

17. (new) The polishing machine for a peripheral edge of a semiconductor wafer according to claim 14, wherein the hollow cylindrical shaped rotary body comprises n-polar and s-polar magnets alternatively arranged on its inner surface.